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(19) World Intellectual Property Organization  
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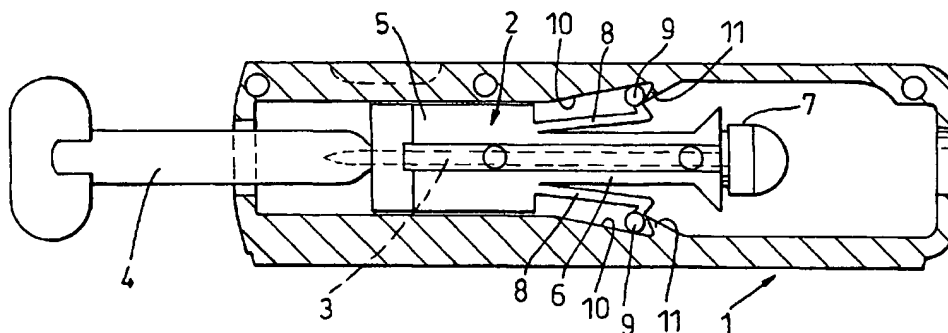
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- (71) Applicant (for all designated States except US): OWEN MUMFORD LIMITED [GB/GB]; Brook Hill, Woodstock, Oxford OX20 1TU (GB). Published:  
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- (72) Inventor; and
- (75) Inventor/Applicant (for US only): MARSHALL, Jeremy [GB/GB]; 16 Cranham Street, Jericho, Oxford OX2 6DD (GB). For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: IMPROVEMENTS RELATING TO SKIN PRICKERS



(57) Abstract: A skin pricker for blood sampling has a barrel (1) housing a lancet (2) which can be pushed back against a spring to a primed condition, by an elongate cap (4) over its needle tip there to be held by a trigger. The cap (4) is removed by twist and pull action. The lancet body (5, 6) has integrally formed spring arms (8, 18) extending rearwardly and alongside, and when the lancet (2) is fired these are momentarily flexed inwardly as their tips (9, 19) snap past abutments (11) within the barrel (1). These act as ratchets, providing a first defence against re-priming of the pricker. If that first defence is overcome by a substantial rearward force on the lancet, the spring arms rearward pointing V's which wedge between the abutments (11) and the lancet body (6). The cap (4) may have a weakness (20, 21) leaving it rigid enough for the initial priming but which causes it to buckle if used to try to overcome the ratchet.

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Improvements relating to skin prickers

This invention relates to skin prickers. It is a development of that described in EP-B-0634000, and is concerned with ensuring that the lancet, once fired, cannot  
5 be pushed back via the needle tip aperture, re-cocked and re-fired.

According to one aspect of the present invention there is provided a disposable pricker comprising an elongate housing with a spring-loaded, longitudinally movable lancet  
10 carried therein, the lancet tip normally being within the housing, a trigger mechanism to retain the lancet in a fully retracted position energising the spring means and actuatable to release or fire the lancet to cause the tip to have a momentary position projecting from the forward end  
15 of the housing, and means for preventing repeated use including a spring finger extending rearwardly from the lancet alongside but spaced from the body thereof, and an abutment on the inside of the housing past which the tip of the finger cap snap during forward motion of the lancet,  
20 any attempt to push the lancet back with a greater than predetermined force after firing causing the finger, with its tip arrested by the abutment, to buckle into a rearward pointing V that wedges between the abutment and the body of the lancet.

25 Preferably, the lancet is symmetrical, with two fingers on opposite sides thereof. The housing will then have two opposed abutments, and these may be shaped as

barbs pointing inwards and forwards.

In one form the or each finger inclines outwardly from the lancet body as well as extending rearwardly.

Alternatively the or each finger may be generally  
5 parallel to and spaced from the adjacent part of the body of the lancet but with its tip flaring outwardly.

The needle tip may initially be protected by an elongate cap by which the lancet can be pushed back to the fully retracted position from an initial pre-fired position  
10 with the or each finger tip immediately to the rear of the associated abutment. For preventing this cap being usable to force the lancet back beyond the position at which it is held by the abutment(s) after firing, the elongate cap preferably has a weakness that is not significant when the  
15 cap is used for retracting the lancet from said initial position. However, it will cause the cap to deform if the cap is subjected to excessive axial compression, as when being used to try to push the lancet back after firing. This weakness is conveniently by way of a local reduction  
20 of the cross-section of the elongate cap, the deformation being buckling.

This cap with a weakness need not be confined to the lancet and pricker defined above.

Therefore, according to another aspect of the present  
25 invention there is provided a lancet for a skin pricker, the lancet having a plastics body integrally moulded with a breakaway cap around a needle, the cap having an elongate

stem aligned with the needle and with an end encasing the  
needle tip, the latter being exposed when the cap is  
removed, wherein the stem has a zone of weakness whereby  
longitudinal compression of the cap above a predetermined  
5 level will cause the stem to buckle.

The zone of weakness is conveniently created by at  
least one notch indented into the stem, and preferably  
there will be two notches on opposite sides and mutually  
offset longitudinally of the stem. Other possibilities are  
10 a transverse bore through the stem, or the latter being  
formed with a neck.

For a better understanding of the invention, some  
embodiments will now be described, by way of example, with  
reference to the accompanying drawings, in which:

15 Figure 1 is an axial section of a skin pricker after  
its lancet has been fired,

Figure 2 is a similar section showing an attempt to  
retract the lancet after firing,

Figure 3 is an axial section of another skin pricker  
20 before its lancet is fired,

Figure 4 is a similar section showing the lancet of  
Figure 3 after firing,

Figure 5 is a side view of a skin pricker with a  
safety cap for the needle tip, and

25 Figure 6 is a similar side view showing the cap being  
used to try to retract a fired lancet.

The device of Figures 1 and 2 has a barrel 1 of two

halves joined at a longitudinal split to hold a lancet 2. The lancet has a plastics body encasing a needle 3 whose tip is initially embedded in a twist-off elongate cap 4 moulded integrally with the body. The cap serves the same  
5 purpose as that in EP-B-0634000. The spring that drives the lancet forwards and the trigger that releases it are not shown for simplicity.

The lancet body has a large head 5 non-rotatably guided in the forward part of the barrel. A stem 6 extends  
10 rearwardly from the head terminating in a formation 7 that locates the leading end of the spring. At opposite sides of the stem fingers 8 lead outwardly and rearwardly from the roots of the shoulders at the transition between the head 5 and the stem 6. They terminate in enlargements 9.  
15 Being integrally moulded with the plastics body, they are resiliently flexible and can act as springs.

At about its mid-length the interior of the barrel 1 widens towards the rear at opposite sides in gradual slopes  
10 terminating in inwardly and forwardly angled barbs 11.

20 Initially, with the spring relaxed, the enlargements 9 are behind the barbs 11. The cap 4 is pressed to retract the lancet, and the device is then cocked. The cap is twisted off and the device is applied and fired. The thrust of the spring urges the lancet forwards and the  
25 fingers 8 flex inwards as the enlargements 9 snap past the barbs 11, just before the needle tip momentarily emerges from the forward end of the barrel. As the over extended

spring retracts, the enlargements 9 slide along the slopes 10 until they engage the hooks formed by the barbs 11.

There is effectively a ratchet mechanism.

This is the position shown in Figure 1, with the cap 4  
5 pushed back in with a view to restoring the device to its cocked condition.

However, if the cap is pushed further, while the main body of the lancet will move, at least initially, the fingers 8 are trapped. They will then buckle as shown in  
10 Figure 2 to form rearward pointing Vs, and thus wedges that will jam between the barbs 11 and the stem 6. The enlargements 9 ensure that the ends of the fingers 8 do not flip clear of the barbs.

Thus the lancet is arrested and immobilised before the  
15 cocked position is reached, and re-firing is prevented.

The device of Figures 3 and 4 is similar in many respects to that of Figures 1 and 2, and corresponding parts are similarly referenced.

The significant difference lies in the spring fingers,  
20 now referenced 18. They extend rearwardly from the tips of the shoulders at the transition between the head 5 and the stem 6, and they normally lie parallel to and spaced from that stem. They terminate in outwardly flared tips 19.

The ratchet operation is similar to that described.  
25 When the lancet is fired, towards the end of its forward movement the tips 19 snap past the barbs 11, momentarily flexing the arms 18 inwards. The bounce back of the lancet

leaves the tips 19 loosely engaging those barbs. Any rearward force on the lancet enhances that engagement, and rearward movement of the lancet is resisted by the arms 18, which remain straight under light longitudinal compression.

5 However, once the rearward force reaches a certain level they begin to bend and the arms flex inwards rather than outwards, as shown in broken lines in Figure 4, by virtue of the engagement of the tips by the barbs outside the main length of the arms. The tips 19 will spear outwardly as

10 well as rearwardly into the acute angles of the barbs 11 and will therefore be less likely to jump those barbs. Further force will cause the arms to buckle and wedge as in the previous embodiment.

These are necessarily small devices and the size of

15 the barbs 11 and the arms that engage them are correspondingly small. While they will operate as described when moderate rearward force is applied to the lancet after firing, a really determined push could break down the engagement at the barbs 11 and re-cock the device.

20 The obvious instrument for applying this push is the elongate cap 4, removed but perhaps not discarded immediately prior to use.

As a further safety measure, applicable not just to the embodiments described, the cap 4 may be constructed to

25 render it useless for retracting the lancet after firing. In the example of Figures 5 and 6 two notches 20 and 21 are formed in opposite sides at slightly different axial

positions around the mid-length of the stem of the cap,  
making a zig-zag. The cap 4 will be rigid enough for the  
initial cocking of the device against the spring, but if  
the lancet is held by the barbs 11, the cap will buckle as  
5 shown in Figure 6 before the barbs 11 or the tips of the  
arms 8 or 18 give way.

Another way of weakening the cap, which may be  
preferred, is simply to have a transverse bore through it  
at around the mid-length. Alternatively, just one notch  
10 may suffice, or it may be formed with a neck.

In the embodiments described, the lancet is  
symmetrical, with spring arms 8 or 18 on opposite sides.  
While this is preferred, it would be possible to construct  
and guide the lancet so that only one arm would suffice.

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CLAIMS

1. A disposable pricker comprising an elongate housing with a spring-loaded, longitudinally movable lancet carried therein, the lancet tip normally being within the housing, a trigger mechanism to retain the lancet in a fully retracted position energising the spring means and actuable to release or fire the lancet to cause the tip to have a momentary position projecting from the forward end of the housing, and means for preventing repeated use including a spring finger extending rearwardly from the lancet alongside but spaced from the body thereof, and an abutment on the inside of the housing past which the tip of the finger cap snap during forward motion of the lancet, any attempt to push the lancet back with a greater than predetermined force after firing causing the finger, with its tip arrested by the abutment, to buckle into a rearward pointing V that wedges between the abutment and the body of the lancet.
2. A disposable pricker as claimed in Claim 1, wherein the lancet is symmetrical, with two fingers on opposite sides thereof, and the housing has two opposed abutments.
3. A disposable pricker as claimed in Claim 1 or 2, wherein the or each abutment is shaped as a barb, pointing inwards and forwards.
4. A disposable pricker as claimed in Claim 1, 2 or 3, wherein the or each finger inclines outwardly from the lancet body as well as extending rearwardly.

5. A disposable pricker as claimed in Claim 1, 2 or 3, wherein the or each finger is generally parallel to and spaced from the adjacent part of the body of the lancet but with its tip flaring outwardly.
- 5 6. A disposable pricker as claimed in any preceding claim, wherein the needle tip is initially protected by an elongate cap by which the lancet can be pushed back to the fully retracted position from an initial pre-fired position with the or each finger tip immediately to the rear of the  
10 associated abutment.
7. A disposable pricker as claimed in Claim 6, wherein the elongate cap has a weakness that is not significant when the cap is used for retracting the lancet from said initial position but which causes the cap to deform if used  
15 to try to push the lancet back after firing.
8. A disposable pricker as claimed in Claim 7, wherein the weakness is by way of a local reduction of the cross-section of the elongate cap, the deformation being buckling.
- 20 9. A lancet for a skin pricker, the lancet having a plastics body integrally moulded with a breakaway cap around a needle, the cap having an elongate stem aligned with the needle and with an end encasing the needle tip, the latter being exposed when the cap is removed, wherein  
25 the stem has a zone of weakness whereby longitudinal compression of the cap above a predetermined level will cause the stem to buckle.

10. A lancet as claimed in Claim 9, wherein the zone of weakness is created by at least one notch indented into the stem.

11. A lancet as claimed in Claim 10, wherein there are two  
5 notches on opposite sides and mutually offset longitudinally of the stem.

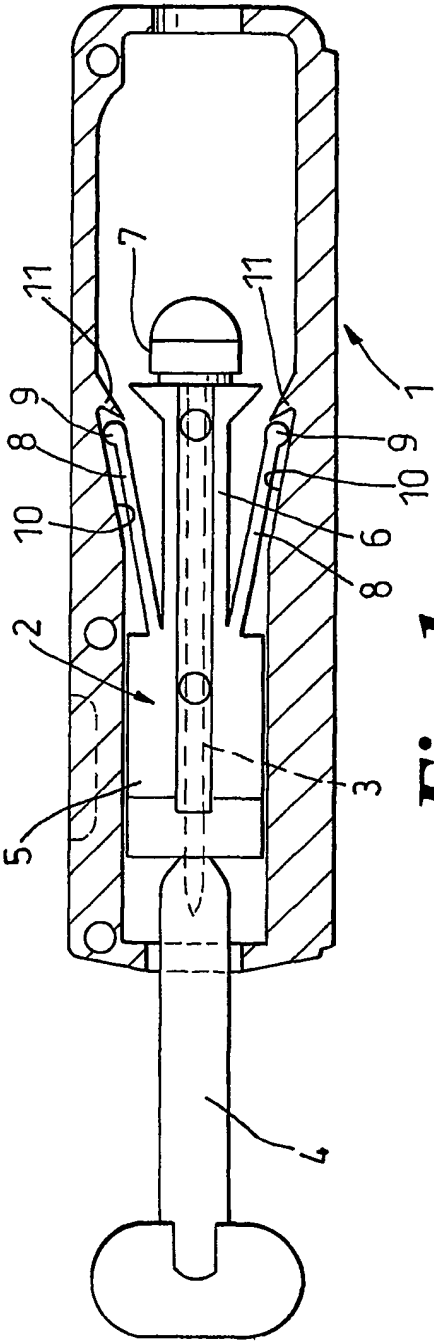
12. A lancet as claimed in Claim 9, wherein the zone of weakness is created by a transverse bore through the stem.

13. A lancet as claimed in Claim 9, wherein the zone of  
10 weakness is created by a neck in the stem.

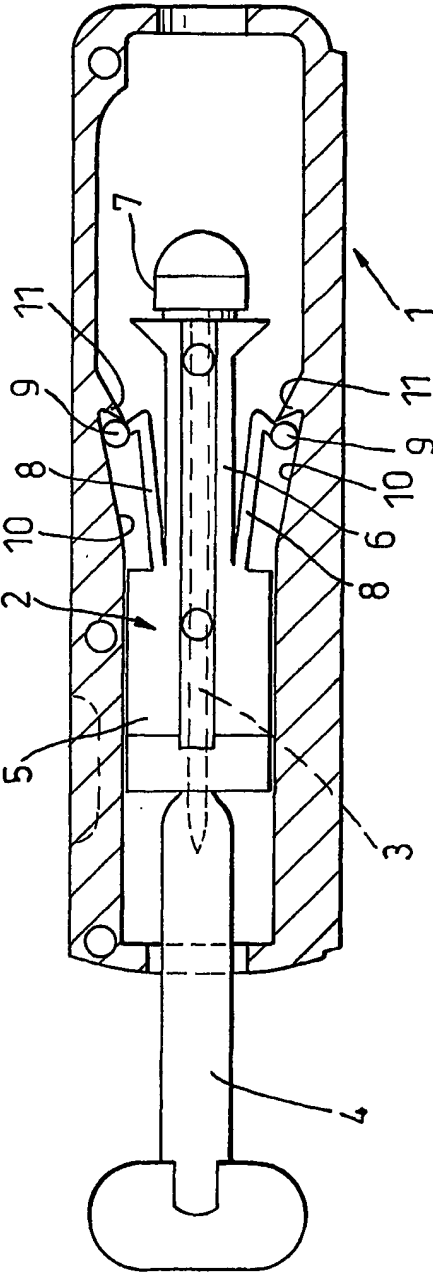
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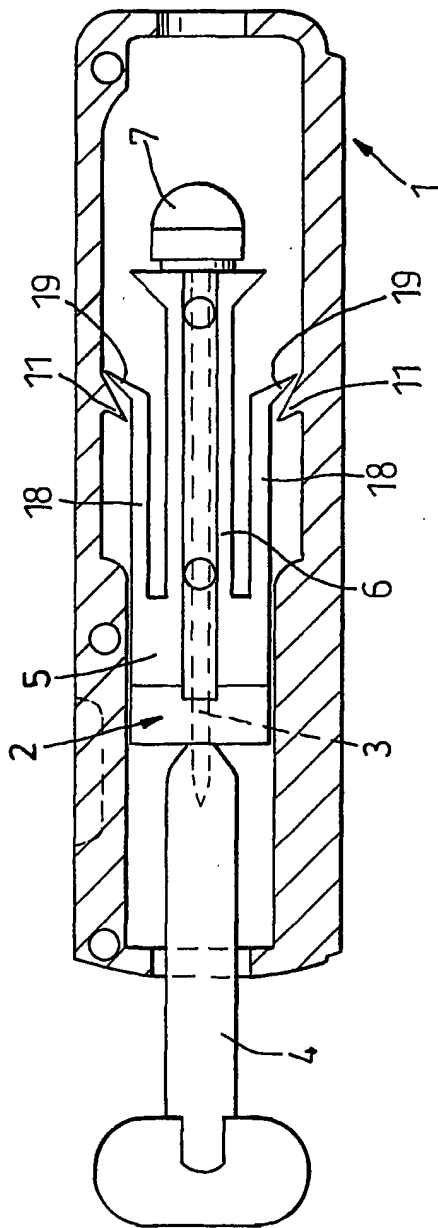
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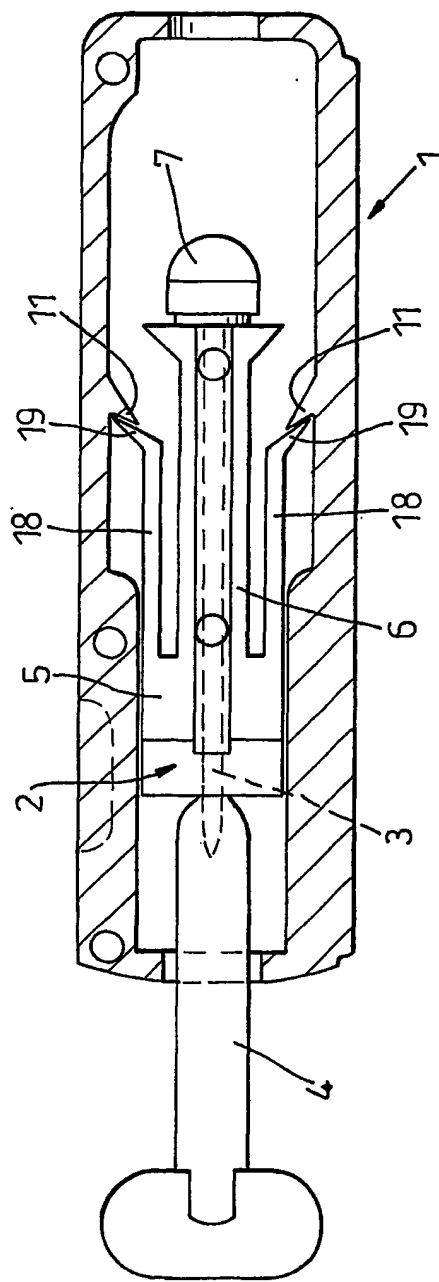
**Fig. 1**



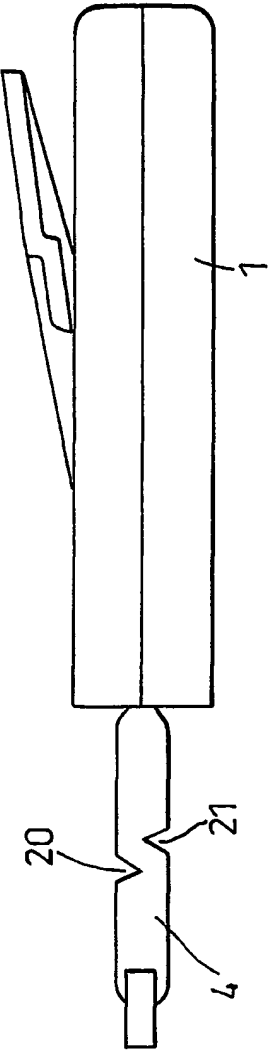
**Fig. 2**



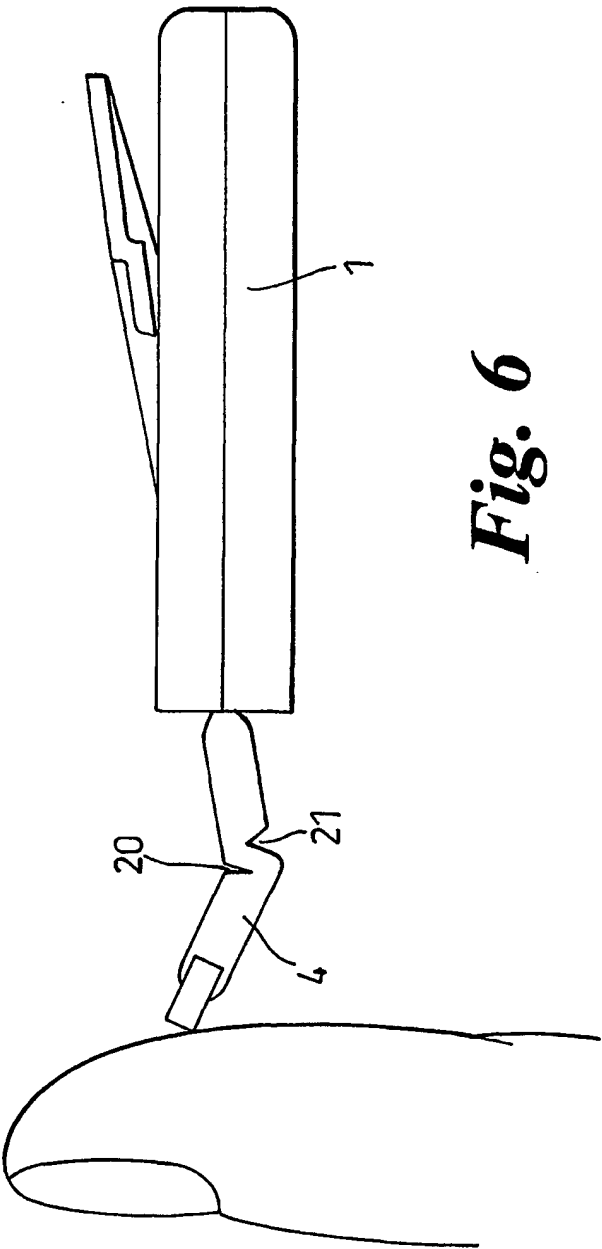
*Fig. 3*



*Fig. 4*



*Fig. 5*



*Fig. 6*

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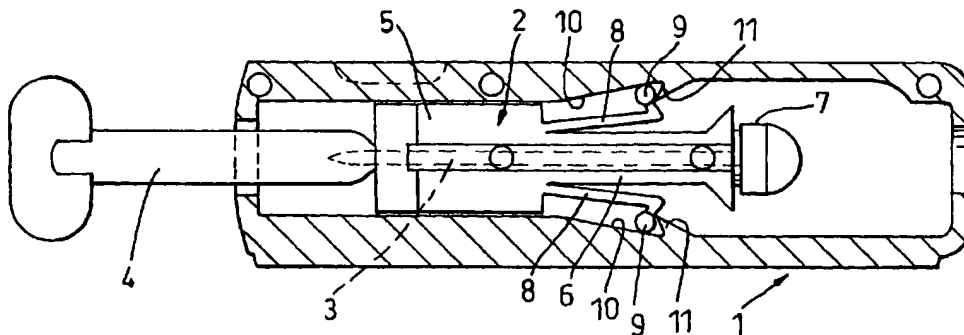
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- (51) International Patent Classification<sup>7</sup>: **A61B 5/15** (74) Agents: **LAINE, Simon, James et al.**; Wynne-Jones, Laine & James, 22 Rodney Road, Cheltenham, Gloucestershire GL50 1JJ (GB).
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- (26) Publication Language: English
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- (71) Applicant (*for all designated States except US*): **OWEN MUMFORD LIMITED** [GB/GB]; Brook Hill, Woodstock, Oxford OX20 1TU (GB). Published:  
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- (72) Inventor; and (88) Date of publication of the international search report:  
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- (75) Inventor/Applicant (*for US only*): **MARSHALL, Jeremy** [GB/GB]; 16 Cranham Street, Jericho, Oxford OX2 6DD (GB).  
*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: IMPROVEMENTS RELATING TO SKIN PRICKERS



(57) Abstract: A skin pricker for blood sampling has a barrel (1) housing a lancet (2) which can be pushed back against a spring to a primed condition, by an elongate cap (4) over its needle tip there to be held by a trigger. The cap (4) is removed by twist and pull action. The lancet body (5, 6) has integrally formed spring arms (8, 18) extending rearwardly and alongside, and when the lancet (2) is fired these are momentarily flexed inwardly as their tips (9, 19) snap past abutments (11) within the barrel (1). These act as ratchets, providing a first defence against re-priming of the pricker. If that first defence is overcome by a substantial rearward force on the lancet, the spring arms rearward pointing V's which wedge between the abutments (11) and the lancet body (6). The cap (4) may have a weakness (20, 21) leaving it rigid enough for the initial priming but which causes it to buckle if used to try to overcome the ratchet.

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## INTERNATIONAL SEARCH REPORT

International Application No

GB 01/05181

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A61B5/15

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

\* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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"&amp;" document member of the same patent family

Date of the actual completion of the international search

23 May 2002

Date of mailing of the international search report

05.06.02

Name and mailing address of the ISA

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Dhervé, G



## INTERNATIONAL SEARCH REPORT

International Application No

P GB 01/05181

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/GB 01/05181

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. Claims: 1-8

A disposable pricker comprising means for preventing repeated use.

2. Claims: 9-13

A lancet for skin pricker comprising a cap with a stem having a zone of weakness.

## INTERNATIONAL SEARCH REPORT

International Application No

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